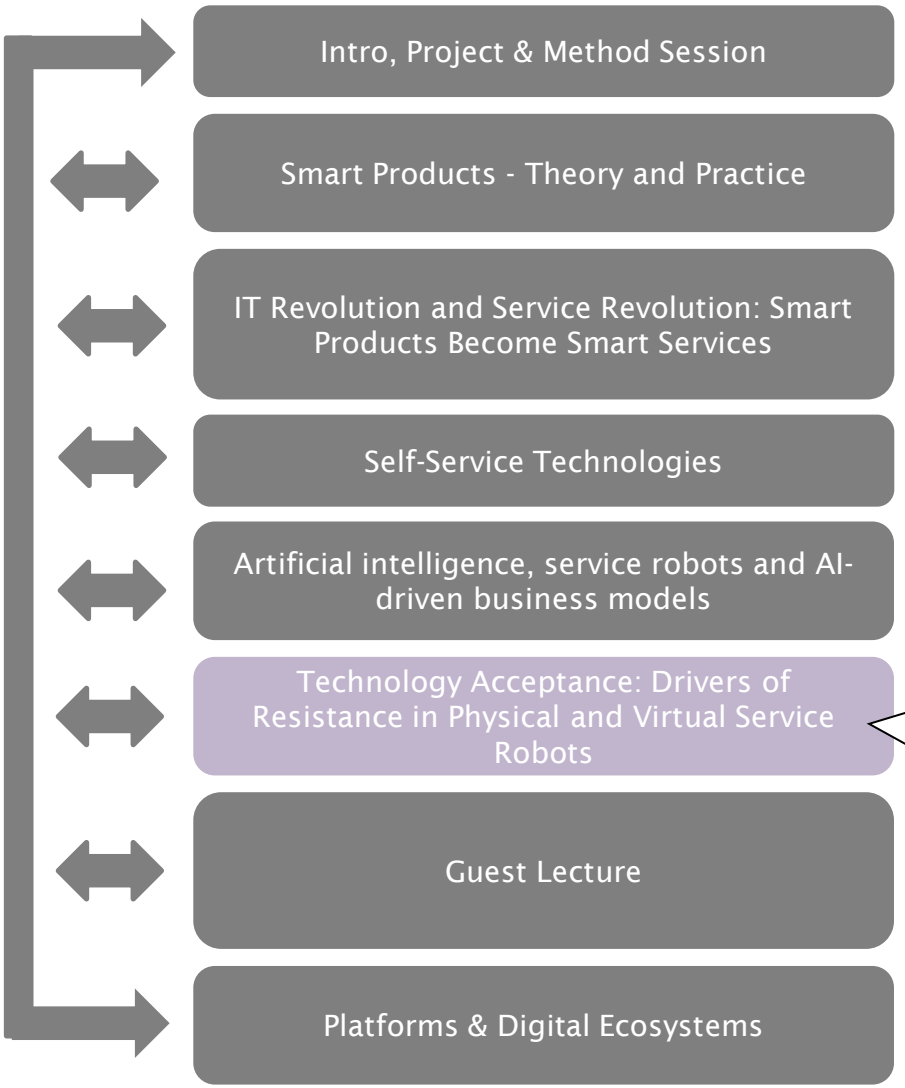
Technology acceptance: Drivers of resistance to physical and virtual service robots

Dr. Stefan Raff

Berner Fachhochschule | Haute école spécialisée bernoise | Bern University of Applied Sciences

THEMATIC STRUCTURE OF THIS MODULE



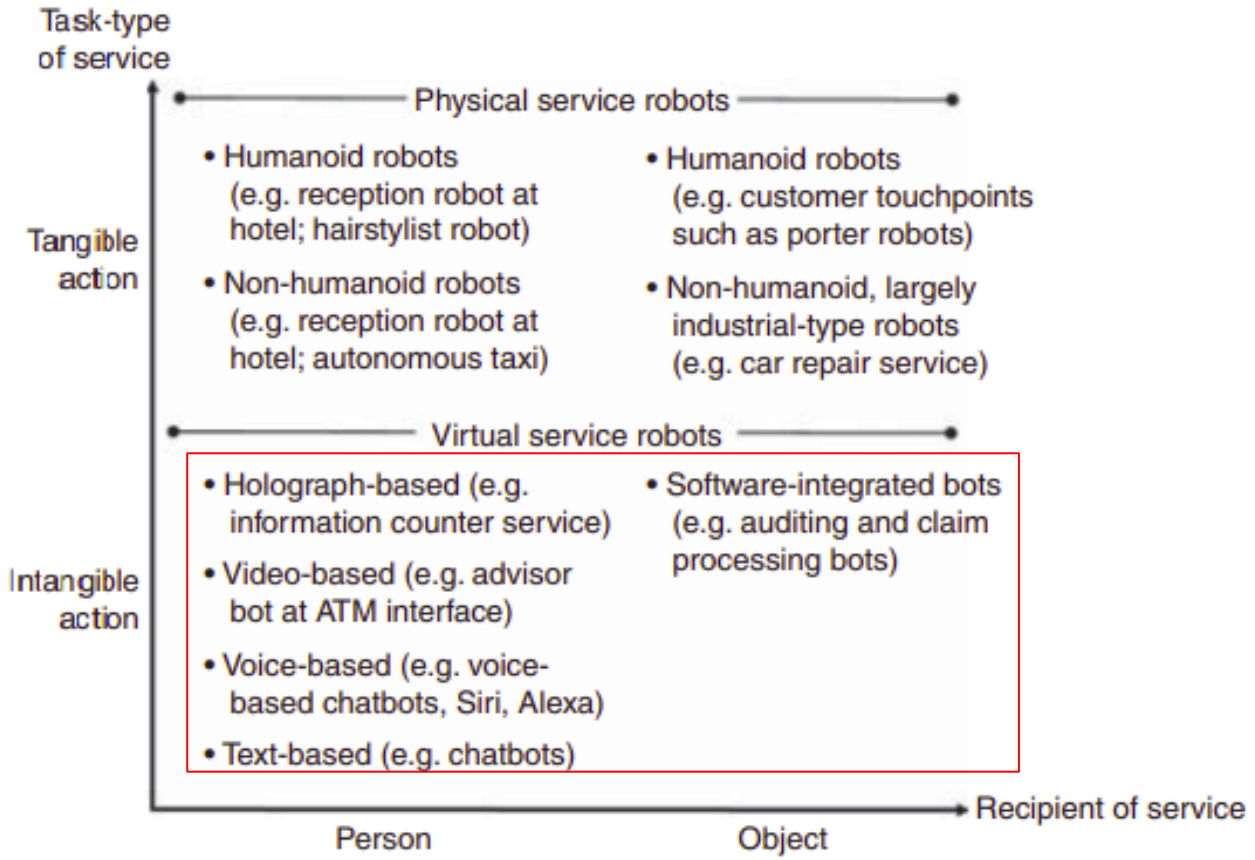
- What are the barriers and drivers to robo-advice?
- What are the implications of this?
- Barriers to smart home assistants (SHA) (and the special role of perceived creepiness).
- What design forms of SHAs should practitioners avoid, if possible?

SERVICE ROBOT DEFINITION

Service robots are system-based autonomous and adaptable interfaces that interact, communicate and deliver service to an organization's customers.

Source: Wirtz et al. (2018)

SERVICE ROBOT TYPES



Source: Wirtz et al. (2018)

Drivers and barriers

Technology Acceptance – Drivers and Barriers

Drivers/Enablers and barriers/inhibitors are one's external beliefs about the system's attributes that influence a user's adoption/acceptance or rejection decision.

Drivers/Enablers	Barriers/Inhibitors
The term "enabler" refers to those external beliefs regarding the design and functionality of a system that either *encourage* or *discourage* usage, dependent on valence. e.g., systems/technologies that are perceived to be reliable are used; unreliable ones are not.	Inhibitors, in contrast to enablers, is that they act *solely* to discourage use. e.g., If an online purchase transaction is completed without incident, it is unlikely to be noticed, let alone perceived positively. However, if something goes wrong, it is a barrier/red flag to future use.

Source: Cenfetelli (2004)

DRIVERS OF THE USE OF AI-SERVICE: ROBO ADVICE

Higher comfort

"So the main advantage for me is convenience. If I have a long-term investment horizon and don't want to worry about it, it's great. Then I find it a very convenient solution."
Customer Robo Advice

Lower prices and fees

"Compared it roughly... You pay 0.5 percent on the value you invest. And then everything is actually covered. It's much cheaper than anything else." Customer Robo Advice

More flexibility

"The advantage is that you can access it at any time and make changes and adjustments yourself." Customer Robo Advice

Better performance

"I've had the feeling in the past that the investment advisors are not really in the know at all and that they're selling something they have to sell. The stocks have not been, how should I say this, properly analyzed at all. Robo advice is great. There you can analyze titles properly."
Customer Robo Advice

Source: Focus groups FHS St.Gallen (2017) as part of the research project "Robo Readiness".

BARRIERS OF THE USE OF AI-SERVICE: ROBO ADVICE

Need for interaction

"The moment I realize that the person is listening to me, that's good. If I then realize the suggestions that are needed match what I said, then I walk out satisfied." Customer personal consultation

Technology fear

"When I walk into the bank, I have a sense of security and that my money is in the right place. At home on the computer, you always have to worry about hacking or those things." Customer personal advice

Technical skills and knowledge

"So I do think they have to be pretty advanced in computer skills". Client personal advice on Robo Advice

Source: Focus groups FHS St.Gallen (2017) as part of the research project "Robo Readiness".

ALGORITHM AVERSION & UNIQUENESS NEGLECT

Algorithm aversion
= Customers prefer human judgments or predictions, even though statistical/mathematical judgments and predictions by algorithms have been shown to be more accurate than human ones. (Dietvorst, Simmons & Massey, 2015)

→ A possible explanation for the algorithm aversion is the *uniqueness neglect*.

= Concern that personal and individual needs are not or insufficiently addressed by AI-based tools.

That is, because:

- Consumers perceive themselves as unique compared to other people
- Machines, on the other hand, would consider every human equal because of their programming. (Longoni, Bonezzi & Morewedge, 2019)

Source: Raff et al. (2021)

ALGORITHM AVERSION & UNIQUENESS NEGLECT

What might AI-based guidance tools look like to overcome these barriers to acceptance?

- Integrated personalized interaction
  - Obtain more individual information about the customer
  - Personalized customer interaction
  - → Empathic AI

- Integration of a specialist (e.g. in medicine) who signs off on diagnoses or recommendations of AI-based consulting solutions
  - → Hybrid design form of AI-based consulting tools

Source: Raff et al. (2021)

BREAKING RELATIONSHIP STANDARDS

- Strong (and thus long-term) customer relationships lead to increased loyalty and referral behavior positive effect for the service provider
- Distinguish between two types of relationships:

Exchange relationship	Communal Relationship
= both parties primarily pursue economic objectives ("quid pro quo").	= A person's expectation that relationship partners will care about their well-being, show empathy, and not seek to maximize their own interests.

Source: Raff et al. (2021)

BREAKING RELATIONSHIP STANDARDS

Example: Financial consulting

- Client and financial advisor (in most cases) have a joint relationship
- Automated consulting could give the impression that the automated relationship partner only wants to maximize the efficiency of the consulting process. Friendly interaction is less of a priority.

→ Violation of the previously valid relationship norms
→ Sense of appreciation is lost

What might AI-based guidance tools look like to overcome these barriers to acceptance?

- Hybrid solution (human component is included in the automated consulting process)
- AI-based consulting only for exchange relationships

Source: Raff et al. (2021)

PERCEIVED CREEPINESS

= In interpersonal relationships or social contexts, creepiness is characterized primarily by **uncertainty about** whether there is something to fear from the human counterpart and/or **uncertainty about the** exact nature of any threat. (McAndrew & Koehnke, 2016)

In the context of AI-based consulting tools:

= **Ambiguity** and **opacity** regarding the exact operations AI-based advisory tools perform when processing personal data or the deviation from common norms can cause creepiness on the part of users. (Watson & Nations, 2019)

Source: Raff et al. (2021)

PERCEIVED CREEPINESS

Uncanny Valley effect (uncanny valley)

= The effect describes the fact that AI-based application forms (e.g., robots or avatars) that appear highly anthropomorphized, yet are not perceived as human, evoke strong aversion and are perceived as creepy. (Mori, MacDorman & Kageki, 2012)

→ Problematic when AI-based consulting solutions have a human appearance but are not perceived as human
→ Leads to aversion and feelings of creepiness and fear

What might AI-based guidance tools look like to overcome these barriers to acceptance?

- Hybrid design: e.g. human consultant who instructs on the tool
- Transparency regarding the underlying algorithms, processes and decisions (*algorithmic transparency*)

Source: Raff et al. (2021)

ALGORITHMIC TRANSPARENCY

= Organizations shall disclose,

- What **data** is **collected**, **used** and **shared**
- in which way they **develop** and **use algorithms** and
- what **consequences** result from the use of these algorithms

→ The relevance of *algorithmic transparency* stems from the challenges of AI-based advisory solutions (algorithm aversion, creepiness, etc.).
→ People want to be treated ethically (by other people, organizations, and government)

Source: Raff et al. (2021)

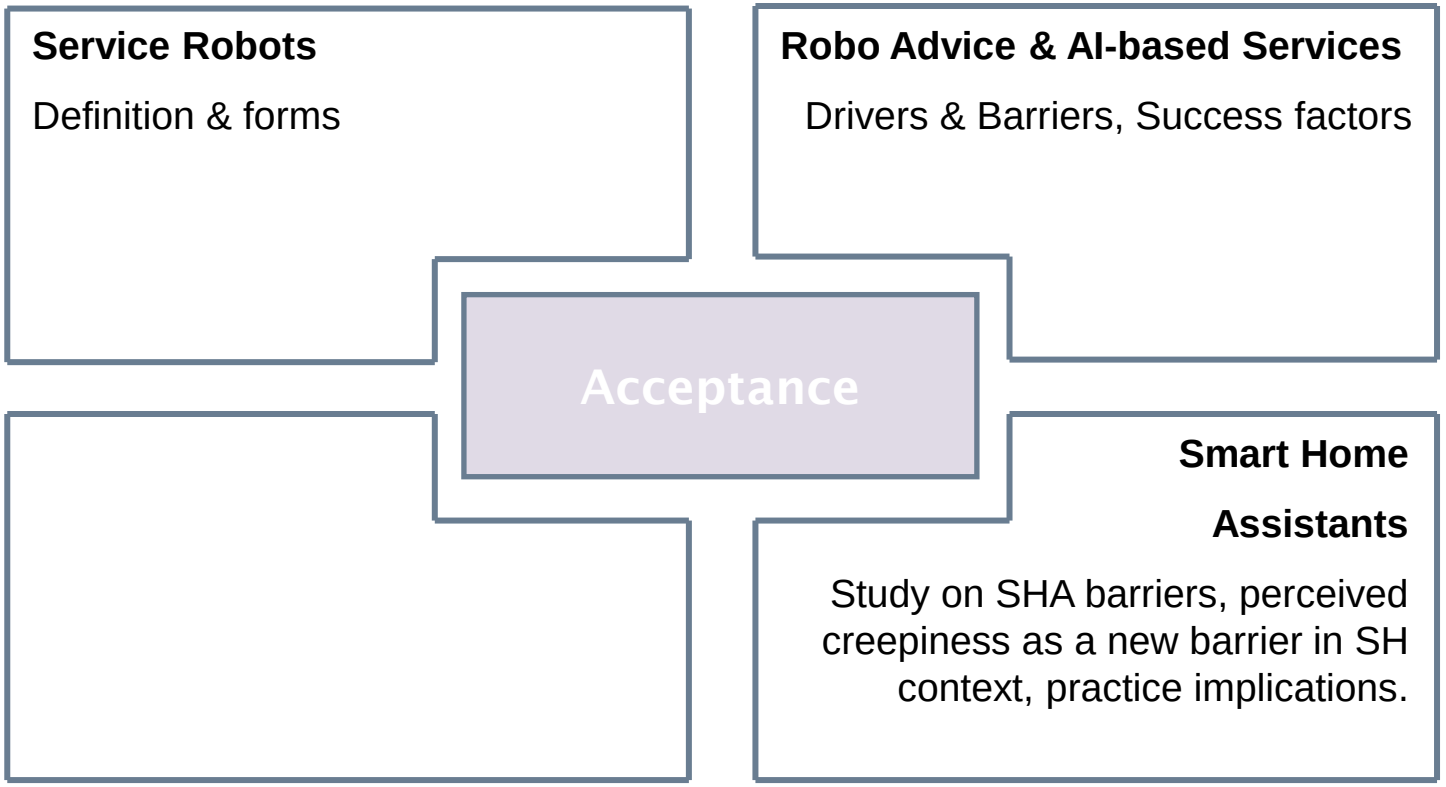
PROMOTING ACCEPTANCE - SUCCESS FACTORS

- **Build trust:** Customers who trust the service provider are more likely to accept new technologies launched by the provider.
- **Reliability and usability**: Technologies must be reliable and have very good usability. Recommendation: Tests with customers.
- **Clear and communicable relative advantages:** Technologies must offer a relative advantage over personal service from the customer's point of view. This must be clearly communicated.
- **Take customers' routines into account:** Technologies often require customers to change their familiar routines. This should already be taken into account during development.
- **Support and training:** Support processes and hybrid solutions are important in introductory phases. Some service providers also successfully offer training.
- **Recovery solutions:** Should a technology failure occur, an alternative solution should be available.
- **Ease of use & usefulness**

Source: Lovelock, C., & Wirtz, J. (2016). Services Marketing: People, Technology, Strategy (8th ed.).

Wrap-up

WRAP-UP


Service Robots
Definition & forms
Robo Advice & AI-based Services
Drivers & Barriers, Success factors
Acceptance
Smart Home Assistants
Study on SHA barriers, perceived creepiness as a new barrier in SH context, practice implications.